

**U.S. Environmental Protection Agency
BOARD OF SCIENTIFIC COUNSELORS
Land Restoration and Preservation Program Subcommittee
Meeting Summary**

**U.S. Environmental Protection Agency
Andrew W. Breidenbach Environmental Research Center
Cincinnati, Ohio
December 13-15, 2005**

TUESDAY, DECEMBER 13, 2005

Welcome and Opening Remarks

Dr. Charlie Menzie, Chair, Land Restoration and Preservation Program Subcommittee

The meeting was called to order at 8:38 a.m. by Dr. Charlie Menzie, the Chair of the Land Restoration and Preservation Subcommittee. He welcomed the Subcommittee members and thanked the U.S. Environmental Protection Agency (EPA) staff for their time and effort in preparing an impressive set of materials for the meeting. He thanked Ms. Heather Drumm, the Designated Federal Officer (DFO) for the Land Restoration and Preservation Subcommittee, for her efforts in arranging the face-to-face meeting and Dr. Jim Clark, the Vice Chair of the Subcommittee, for his support.

The Land Restoration and Preservation Research Program Multi-Year Plan (MYP) embraces a wide array of activities and research initiatives. The focus of the Subcommittee will be on four charge questions related to the relevance, quality, performance, and leadership of the program. At the end of the meeting, the Subcommittee will have developed a rough draft of their insights, impressions, and consensus points. More work will be needed to polish the report for presentation to the Board of Scientific Counselors (BOSC) Executive Committee at its meeting in Washington, DC, on February 14, 2006. He asked that Subcommittee members hold their questions until the end of each presentation and explained that the poster sessions would provide the opportunity to engage EPA's Office of Research and Development (ORD) scientists in discussion about their research. The third day of the meeting, Thursday, December 15, 2005, will be devoted to writing the rough draft of the report. He concluded the welcome by introducing Ms. Drumm.

DFO Welcome and Charge

Ms. Heather Drumm, DFO, Office of Science Policy (OSP), ORD, EPA

Ms. Drumm welcomed and thanked the Subcommittee members for their work to date and their ongoing efforts on behalf of the BOSC. She asked Subcommittee members to introduce themselves:

- Dr. Charlie Menzie (Chair), Menzie-Cura & Associates, Inc.
- Dr. James Clark (Vice Chair), ExxonMobil Research and Engineering Company
- Dr. Todd Bridges, U.S. Army Research and Development Center
- Dr. Barry Dellinger, Louisiana State University
- Dr. Lynne Haber, Toxicology Excellence for Risk Assessment
- Dr. Eugene Keating, Environmental Kinetics, Ltd.
- Mr. Robert Phaneuf, New York State Department of Environmental Conservation
- Dr. Robert Siegrist, Colorado School of Mines
- Mr. Tim Thompson, Science & Engineering for the Environment, LLC

Ms. Drumm reviewed the administrative procedures and Federal Advisory Committee Act (FACA) rules pertaining to the BOSC public meetings. The BOSC is a chartered federal advisory committee the purpose of which is to provide independent scientific peer review and recommendations to EPA's ORD. This Subcommittee was established by the BOSC to review ORD's Land Restoration and Preservation Research Program. This is the first and only face-to-face meeting of this Subcommittee. The Subcommittee members participated in an administrative conference call on November 17, 2005. Additionally, the Subcommittee met via teleconference on November 28, 2005, and on December 9, 2005. A follow-up teleconference is planned for January 2006 to finalize the report. The Executive Committee has the authority to evaluate and revise the report, which then is submitted to ORD; the right of decisionmaking remains with EPA.

As DFO, Ms. Drumm serves as the liaison between EPA and the Subcommittee, as well as the public. She also is responsible for ensuring that the meeting complies with rules set by FACA. This meeting was announced in the *Federal Register* on October 24, 2005. The meeting is open to the public, and there will be an opportunity for public comment, with time provided at 3:05 p.m. on Wednesday, December 14, 2005. No members of the public have requested time to make comments. Minutes of the meeting are being taken for the public record, will be certified by the Chair within 90 days, and will be made available to the public. All Subcommittee documents also are available to the public. Copies of this meeting's presentations, background material given to the Subcommittee in preparation for this review, and the final report are available upon request. All Subcommittee members have filed standard government financial disclosure reports to ensure that there are no conflicts of interest and have completed EPA ethics training.

Ms. Drumm requested that Subcommittee members submit their timesheets and travel vouchers, with hotel and car rental receipts attached, to her before the end of the face-to-face meeting so that reimbursements can be processed promptly. She reminded Subcommittee members not to discuss the Land Restoration and Preservation Research Program as a group outside of the meeting as this would violate FACA requirements.

Dr. Jim Clark reminded the Subcommittee that the role of BOSC is to evaluate ORD's research program, with a specific focus on program implementation, and to provide input to ORD. The BOSC review differs from EPA's Science Advisory Board (SAB) reviews, in that SAB reviews assess whether ORD is performing the correct science, and the BOSC reviews assess how that science is planned, implemented, and communicated. He emphasized that the BOSC has a long-term relationship with ORD management with ongoing dialogue and information exchange. The goal of the Subcommittee is to provide a critical review that includes areas in which ORD is doing well and those where there are opportunities for improvement.

He turned the meeting back over to Dr. Menzie, who introduced Dr. William Farland, ORD's Acting Deputy Assistant Administrator for Science.

Office of Research and Development Welcome

Dr. William Farland, Acting Deputy Assistant Administrator for Science, ORD, EPA

Dr. Farland welcomed participants and thanked the Subcommittee members for their work on the review of the Land Restoration and Preservation Research Program. He also thanked EPA staff for compiling the information necessary for the Subcommittee to complete its task successfully. He thanked Ms. Drumm for coordinating the meeting and emphasized that the DFO is an important liaison between the independent members of the Subcommittee and EPA staff.

Within ORD research activities, there are a series of different programs. The Land Restoration and Preservation Research Program will be undergoing a review by the Office of Management and Budget (OMB) within the next year; therefore, this BOSC review is an important review for the program. The Land Program contributes science that assists EPA decisionmakers and also provides products for states

and regions. This review will assist decisionmakers within the Land Program in making research prioritization decisions.

This is the sixth BOSC review in the last year, and EPA has received significant input from each of these reviews. This review will influence the next iteration of the Land MYP. Dr. Farland welcomed the comments and helpful criticism from the Subcommittee members and asked if there were any questions.

Discussion

Dr. Robert Siegrist asked if this was the sixth review of the Land Restoration and Preservation Research Program. Dr. Farland clarified that six different EPA research programs had been reviewed by the BOSC to date.

Dr. Menzie introduced Dr. Randy Wentsel, who provided an overview of EPA's Land Research Program.

Overview the Land Research Program

Dr. Randy Wentsel, National Program Director for Land, ORD, EPA

Dr. Randy Wentsel thanked the Subcommittee members for their time and the EPA staff who made the meeting possible. The objective of the BOSC review of the Land Restoration and Preservation Research Program is to evaluate the relevance, quality, performance, and scientific leadership of the Land Program, and each of the charge questions that the Subcommittee is tasked to answer track with each of these points. The review enables ORD to strengthen the Land Research Program via an outside review of issues that should be considered, supports the Government Performance and Results Act, and assists in OMB evaluations.

The purpose of the Land Restoration and Preservation Research Program is to provide and apply sound science for protecting and restoring land by conducting leading-edge research. The Superfund Amendments and Reauthorization Act (SARA) of 1986 authorized EPA to conduct hazardous substance research and treatment technology research. The SARA statute provides for specific roles to support Superfund science and engineering needs. The Land Restoration and Preservation Research Program MYP combines the former Contaminated Sediments and Resource Conservation and Recovery Act (RCRA) MYPs into one client-oriented MYP with two long-term goals (LTGs) that focus on prevention and restoration activities. Peer review of the activities ensures that ORD is providing scientifically sound products to its clients. The LTGs are divided further into five themes: sediments, groundwater, multimedia, resource conservation, and materials management.

One objective of the Land Restoration and Preservation Research Program is to provide outputs (e.g., data, technical expertise, publications software, models, etc.) for its clients that lead to successful, long-term, environmental outcomes. Although it cannot control intermediate outcomes, such as regions and states utilizing ORD guidance and/or implementing ORD research-influenced policies, ORD understands that producing good products will drive long-term outcomes. Unfortunately, there is not a mechanism in place for states to provide feedback to ORD if they utilize ORD-produced outputs. An example of ORD providing better science to solve problems is illustrated by the sediments research theme. One activity of sediment research was to develop methods and models on the extent of contamination. The output of this research was the development of advanced contaminant fate and transport models and tools for persistent, bioaccumulative, and toxic chemicals, which have been used in guidance and site-specific assessments to reduce uncertainties (i.e., short-term outcome).

In addition to the research themes of contaminated sediments, groundwater, and multimedia, LTG 1 also supports the Superfund, Oil Spill, and Leaking Underground Storage Tanks Programs. LTG 2, which is focused on preservation, is the smaller portion of the Land Research Program and incorporates resource conservation and material management activities. Resource conservation is an important topic to the Office of Solid Waste and Emergency Response (OSWER).

EPA's National Center for Environmental Assessment (NCEA) receives Superfund monetary support, although its efforts fall under a different MYP. NCEA supports the Human Health and Ecological Risk Technical Support Centers (TSCs), provides provisional toxicity values, maintains the Integrated Risk Information System (IRIS), conducts major risk assessments, and produces guidance documents via the Risk Assessment Forum. Another ORD center involved in the Land MYP is the National Center for Environmental Research (NCER), which has historically funded the Hazardous Substance Research Centers (HSRCs), known as centers of excellence. NCER also is responsible for administering the Science To Achieve Results (STAR) Program and the Small Business Innovation Research (SBIR) Program. The Land Research Program, however, does not have dedicated STAR grants or SBIR contracts and relies on the National Institutes of Health (NIH) Superfund Basic Research Program (SBRP) grants that may be related to land research.

Dr. Wentsel concluded his presentation by thanking EPA clients—including Drs. Southerland and Hofmann of OSWER and Dr. Ball from EPA Region 9—and its research partners, including Ms. Anderson of the National Institute of Environmental Health Sciences (NIEHS) and Dr. Leeson of the Strategic Environmental Research and Development Program (SERDP)/Environmental Security Technology Certification Program (ESTCP).

Discussion

Dr. Clark commented that there was extensive coordination with external agencies in the MYP and asked how the program was able to leverage activities outside the Agency. Dr. Wentsel responded that ORD developed a Memorandum of Understanding (MOU) with NIEHS. This in turn allowed EPA and NIEHS to gain a better understanding of the role each plays in providing scientific research. NIEHS has a basic, biomedical research focus, whereas EPA's Land Research Program has an applied, engineering focus.

Dr. Clark asked if EPA uses the knowledge of what other agencies are doing when developing the MYP. Dr. Wentsel responded that the system is not perfect, but they try to incorporate their knowledge of other agencies' research so that there is no research overlap.

Dr. Lynne Haber asked Dr. Wentsel to describe the relationship of the MYP to the EPA Strategic Plan (i.e., Goal 3). Dr. Wentsel responded that some research supports OSWER and Superfund issues, whereas sustainability research assists different parts of ORD with different goals. For example, risk assessment may be part of another goal, but it supports OSWER in this area. The Land Restoration and Preservation Research Program often produces products that can support other EPA goals.

Dr. Eugene Keating commented that industry is a heavy user of basic and applied research; because their products usually are for profit, the time scales are different. He asked if the EPA timescale, which is influenced by the political timescale, has an impact on the products produced. Dr. Wentsel responded that the political agenda usually does not impact EPA's research agenda. ORD listens to the regional and program offices about current needs and shifts research to meet these needs. Engineers often utilize products from industry, but contractors generally utilize Superfund products.

Dr. Siegrist asked how long-term research needs were balanced with strategic planning and budget constraints. Dr. Wentsel responded that because a trust was in place that must be utilized for the Superfund Program, the budget and strategic planning has to stay within the context of the trust.

Dr. Menzie asked if ORD made a projection of anticipated goals. Dr. Wentsel replied that there are annual performance goals (commonly known as APGs) that are being achieved.

Dr. Menzie introduced Ms. Patricia Erickson, who provided overview of the posters that would be highlighted in the first poster session.

Long-Term Goal 1: Overview

Ms. Patricia Erickson, Assistant Laboratory Director, National Risk Management Research Laboratory (NRMRL), ORD, EPA

In the late 1990s, contaminated sediments sites became a research focus at the same time that interest in contaminated soils was declining. In response to this trend, ORD developed the contaminated sediments research theme by transferring resources among goals and research areas and adding sediments to Superfund Innovative Technology Evaluation (SITE) focus areas. As detailed on the Superfund Program Office Web Site, out of more than 200 known contaminated sediment sites, Superfund has selected a remedy at more than 150 sediment sites. Research supports future decisions, as well as design, construction, monitoring, and performance review. When investigating contaminated sediments, there are three key scientific questions: (1) What is the nature and extent of the contamination? (2) What is the risk associated with the contamination? and (3) What is the appropriate risk management option? Answering these questions improves the science, efficiency, and cost effectiveness of the cleanup. The research projects designed to answer these questions will be highlighted in Poster Session 1.

Ms. Erickson gave an overview of the various sediment research projects featured in Poster Session 1. The research projects that investigate the three key scientific questions listed above focus on:

- Development of fate and transport models of baseline and remediation alternatives.
- Development of a surface sampling device.
- Measurement of contaminant migration.
- Investigation of toxicity to ecoreceptors.
- Investigation of risk screening issues.
- Analysis of bioavailability, (e.g., the contribution of desorption-resistant contaminants to receptors).
- Risk management of dredging (e.g., impacts of resuspension, postdredging residual concentrations, and benthic recovery).
- Development of tools to evaluate capping and monitored natural recovery (MNR).
- Evaluation of the performance of capping and MNR.
- Development of new approaches for bioremediation of polycyclic aromatic hydrocarbons (PAHs), electrochemical/electrocatalytic dechlorination, and phytoremediation of sediments in wetlands and confined disposal facilities.

A slide on impacts of the sediments research noted ORD's role in guidance, risk assessment, and technical support. Risk assessment for contaminants in all media is another important research area that supports the Land Restoration and Preservation Program. Although a Human Health Risk Assessment Research MYP has been developed, use of the Goal 3 resources still are planned in conjunction with the overall Land MYP. The key scientific question is: What is the risk associated with the contamination?

Ms. Erickson provided a brief overview of the three posters that describe the risk assessment research that supports the Land Program: (1) establishment of toxicity values for baseline risk assessment and selection of cleanup goals (e.g., IRIS); (2) assessment of risks from exposure to lead; and (3) development of methods, models, and tools to improve risk assessments.

The risk assessment research projects have had numerous impacts. They are used in virtually all Superfund sites for baseline assessment and selection of cleanup goals. IRIS and various guidance

documents are used throughout EPA. The tools developed support waste management and beneficial use of waste materials (e.g., recycling efforts) and rapidly address new priority risks (e.g., vapor intrusion).

Environmental research grants have been part of ORD's Land Research Program and also are funded via the NIEHS SBRP. These programs complement the applied research and technical support conducted by ORD staff. The HSRCs, comprised of academic consortia, are funded through ORD and the Superfund Program Office via competitively awarded grants that are aligned with regional priorities. The five HSRCs conduct research, perform technical outreach, and provide assistance for Brownfield redevelopment. Complimenting the HSRCs is the NIEHS SBRP. One poster included in Poster Session 1 will provide an overview of the current HSRCs, and another will focus on urban HSRC and NRMRL/National Exposure Research Laboratory (NERL) activities supporting the revitalization of Brownfields. The impacts of the HSRCs include published journal articles and research reports; technology transfer, outreach, and state synthesis reports; direct assistance to communities; and training of the next generation of environmental research scientists. Posters were presented on overviews of both programs, as well as a combined poster describing Brownfields research conducted by one of the HSRCs and ORD staff.

The SITE Program demonstrates innovative approaches to the cleanup of contaminated sites to spur acceptance of innovation by providing independent evaluation of vendor-developed technologies. The SITE evaluation process merges the user community, which provides input as to what tools are needed, and the technological community, which reports what tools are available. The SITE Program has provided 156 remediation demonstrations and 47 monitoring and measurement tool evaluations. The Office of Superfund Remediation and Technology Innovation (OSRTI) technology database highlights innovative technologies and gives extra credence to independent demonstration.

Technical support, including support for RCRA corrections and Brownfields in addition to Superfund support, is an integral part of the Land Restoration and Preservation Research Program. Ms. Erickson identified the four TSCs presented in the first poster session. Each of the three components of the program (e.g., basic and applied research, field testing and demonstration, and implementation and technical support) informs the others.

Discussion

Mr. Tim Thompson commented that the SAB identified forward-looking research topics on which EPA should focus, but he did not see any of these research areas represented in the presentation. He asked how the Land Restoration and Preservation Research Program addressed the SAB's recommendations. Ms. Erickson responded that the research topics suggested by the SAB fell under LTG 2. Although the Land Restoration and Preservation Research Program is constrained by funding and other emerging needs, the program did agree with the SAB's assessment and recommendations. For LTG 2 to be visible in the MYP, there will need to be continuous dialogue between the program office and ORD. Dr. Wentsel added that there has not been time to incorporate the SAB's recommendations because composing the MYP was a higher priority. Additional funding, however, will be available and ORD can prioritize its research agenda to include the SAB recommendations. Further discussions with various liaisons also will address the SAB's recommendations.

Mr. Thompson asked how the disinvestment in the SITE Program was being managed and if another program was being implemented to replace the SITE Program. Ms. Erickson replied that the SITE Program is mature and has served the needs of EPA. The Department of Defense (DoD) ESTCP Program still is in place and overlaps with the Superfund Program. EPA is partnering with industry to fund the field-testing component of the SITE Program.

Dr. Keating commented that there needs to be feedback given to the basic and applied researchers at the field-testing level. Ms. Erickson replied that such feedback does occur. Dr. Keating commented that he had not seen documentation that such communication occurs. Ms. Erickson repeated that this

communication does in fact happen, and Dr. Wentsel added that perhaps more documentation of communication should be carried out in the future.

Dr. Todd Bridges asked what percentage of products represent a cross-ORD team (i.e., more than one laboratory or center involved) and what percentage represent a cross-Agency team. Ms. Erickson responded that although she did not have the exact figures, a significant portion of the research and field projects have teams with two or more organizations participating in the research.

Mr. Thompson asked if there were incentives for collaboration. Ms. Erickson replied that because the EPA Strategic Plan emphasized collaboration, ORD fosters team thinking and will continue to expand its collaborative efforts. Mr. Thompson asked if individual scientists were rewarded for teamwork via promotions and so forth. Ms. Erickson responded that, theoretically, scientists were rewarded in this way.

Dr. Siegrist asked if EPA is concerned with biosolids and animal waste. Ms. Erickson responded that this concern is addressed in the Water Quality MYP. Dr. Siegrist asked if attention is paid to microbial contaminants. Ms. Erickson responded that microbial contaminant disposal and decontamination issues are addressed by EPA's Homeland Security Research Program.

LTG 1: Poster Session 1

Poster Session 1 was held in the Atrium area of the building. The Subcommittee reviewed 17 posters in this session. Before the meeting, Dr. Menzie assigned two Subcommittee members to each poster for thorough review and evaluation. During the 90-minute poster session, each Subcommittee member also had the opportunity to ask questions about the research or clarify specific points with the presenter(s). Poster abstracts and a book of poster reproductions were provided to Subcommittee members before the meeting.

Discussion of LTG 1 Poster Session 1

Dr. Menzie had the opportunity to examine the TSC posters and as a result gained a better understanding of various aspects of the technical support groups. The aerial support group, for example, is managed by a small group of individuals who contract out expertise on a competitive basis. There is a high level of confidence in the quality of their work. At the TSC in Las Vegas, Nevada, approximately 50 percent of the work involves statistical support for the regions. Other efforts include chemistry, analyses, and diagnostics. The Brownfields revitalization poster gave a good overview of the efforts being made to develop education and guidance tools to support EPA. There has been significant progress in developing methodologies, such as software products, for regulatory personnel and community use.

Dr. Clark was impressed by the broad involvement of various technical peer reviews and EPA. EPA has been successful in integrating science and technical support. The Human Health TSC has very strong interactions with the regions.

Mr. Robert Phaneuf was charged with providing a broad perspective of all of the posters in the session. The energy that he saw displayed by the researchers during the poster session was encompassing and reassuring. The State of New York is an end user of many of the products developed by this research, and it is obvious that there is a lot of relevance to the research from the perspective of the New York State Department of Environmental Conservation. It also is apparent that there is much quality research being conducted by the program.

Dr. Haber reviewed the exposures and risk assessment posters, including appropriate models and tools, Superfund toxicity assessments, and lead. The research products are subject to many levels of review, but the levels of review are time appropriate given the need. For example, those areas for which research is in urgent need have internal and external reviews at a much faster pace than research areas that are not needed as urgently. There was proof that research products are being utilized, but there are fewer data

collected about how research products are improving assessment following their utilization. Overall, the science appeared to be good, and the leveraging is very impressive.

Dr. Barry Dellinger was tasked with reviewing the SITE Program and the TSCs, including the HSRCs, Ecological Risk Assessment Support Center (ERASC), and Superfund Human Health TSC. The SITE Program and the HSRCs, in his opinion, are two of the most efficient, beneficial programs of EPA. As these programs are closing, it will be necessary to analyze what gaps will be left in their absence and determine how best to address these gaps. ERASC and the Superfund Health TSC are good programs.

Dr. Bridges reviewed the contaminated sediments research posters. This research is providing a model for better methodologies and changing the paradigm to a more iterative approach; this is necessary and commendable. ORD, however, could engage in more gap analysis, as some necessary research areas are covered but others are not. It is not clear that ORD has identified what is of immediate need and what is needed 5 to 10 years into the future. Additionally, ORD needs to become connected to ongoing dredging projects and must address how it will become connected; this is of critical importance.

Mr. Thompson also was tasked with reviewing the exposures and risk assessment posters and stated that Dr. Haber addressed most of the points he wanted to make. He was very interested in learning the schedules, full-time equivalents (FTEs), and budgets of each program. He saw evidence of internal and external quality assurance/quality control (QA/QC) and an appropriate amount of peer review. He was impressed with the degree to which the programs leveraged with Europe and Canada, as well as with other U.S. agencies. EPA should consider to what degree industry is involved in developing various models, determine the barriers to leveraging with industry, and then form a plan to overcome those barriers.

Dr. Keating commented that many of his thoughts had been covered as well. He explained that in developing a standard risk management approach for EPA, the Agency must indicate that appropriate research activities are taking place to prove it is moving forward. EPA also must identify what standards, measurements, methods, and monitoring are taking place to ensure QA/QC of its research.

Dr. Siegrist was asked to review the contaminated sediment research posters. He complimented the presenters on their universal enthusiasm and excitement. All presentations were well done, and all presenters were well informed. He noted that there was a portfolio approach to the research with multilaboratory and multidisciplinary teams. Each presenter also had an understanding of the context in which the research was being conducted and the overall problem being solved. Presenters were willing to state what research had been completed and disseminated and the impacts of that research. There was an infusion of modern tools and framework integration (i.e., physical/chemical with biological) and a balance of basic and applied research. It was clear that needs-driven research was important but also could answer fundamental research questions. He had questions about the long-term plans of the research and pondered if EPA could continue its research to answer long-term questions and gain a long-term perspective. When he asked researchers if seed funding was available for new scientists with a new perspective or idea, the researchers were receptive to the idea; this would be valuable for sustainability. Researchers were able to look to the future needs of research while still focusing on current research needs.

Dr. Menzie asked the Subcommittee members to organize their thoughts on the posters with respect to the charge questions to share with the Subcommittee as a whole before the end of the meeting. He commented that nothing struck him as being misdirected and all projects resonated, addressing key questions in land research.

Following lunch, Dr. Menzie introduced Dr. Robert Puls, who provided an overview of the second poster session.

LTG 1: Poster Session 2 Overview

Dr. Robert Puls, Director of Research, Ground Water and Ecosystems Restoration Division (GWERD), NRMRL, ORD, EPA

The Ground Water Research Program is a highly leveraged program involving EPA regions, EPA program offices, the U.S. Department of Energy (DOE), the U.S. Coast Guard, DoD, and private industry. It is highly responsive to regional needs. The key research questions are: (1) How can dense nonaqueous phase liquid (DNAPL) source zones be remediated effectively? (2) Can uniform and appropriate DNAPL source zone cleanup strategies be developed? (3) Are there effective *in situ* bioremediation methods for DNAPL plumes? (4) Can new *in situ* technologies and a better understanding of subsurface processes accelerate the closure of hazardous waste sites? and (5) Can monitored natural attenuation (MNA) be applied for remediation of contaminants in groundwater with sufficient certainty to meet the Agency's goals for risk reduction and site restoration? The research projects highlighted in Poster Session 2 addressed these key questions.

DNAPLs are the most ubiquitous contaminant, affecting 15,000 to 25,000 sites with an annual cost of \$2.7-\$4.5 billion in the United States. EPA is investigating the monitoring of the dissolved DNAPL plume and DNAPL source zones. There is extensive research evaluating the remediation of DNAPL source zones. New research in this area focuses on the impact of source zone remediation on plume response. Estimations of contaminant mass flux are new tools being developed to better estimate the effectiveness of source zone remedial actions. EPA assembled an international panel of experts on this topic to provide an independent assessment of the state-of-the-science; current ORD research is addressing key conclusions from the panel report. ORD DNAPL research has produced technical guidance for assessing different technologies for DNAPL source areas (e.g., mass flux as a performance metric) and has developed integrated remediation systems. Additionally, ORD scientists are investigating bioremediation of chlorinated solvent plumes.

ORD groundwater research has had an extensive program in the development and performance assessment of permeable reactive barriers as a cost-effective groundwater remedial technology for chlorinated solvent compounds and metal contaminants. Current research is focused on long-term performance monitoring and remediation of metals-contaminated sites. This research program has been a model program for demonstrating the full scope of research needed to bring a technology from basic proof of concept to commercial deployment and acceptance. There have been numerous reports and journal articles produced as a result of this effort, with significant cost savings demonstrated using the technology.

ORD research in monitored natural attenuation (MNA) has addressed fuels, chlorinated solvents, methyl tertiary-butyl ether, and inorganic contaminants, including radionuclides. A new protocol for MNA for inorganics, which was a collaborative effort between EPA regions, the Office of Air and Radiation and the Superfund Program, will be published soon.

More than 100 publications have resulted from groundwater research, and ORD technical protocols and guidance are cited as the most utilized resource at cleanup sites across the United States, especially for MNA assessments.

ORD's oil spills research is strongly coordinated with program offices. The key questions of oil spills research are: (1) How does laboratory research on oil spill countermeasure efficacy testing progress from problem identification to rulemaking? and (2) Can chemical dispersant effects on oil plumes and slicks be modeled effectively? EPA's oil spill research projects address these questions via the development of laboratory screening protocols for determining effective oil spill remediation products and the evaluation of the effectiveness and toxicity of bioremediation agents, dispersants, surface washing agents, and solidifiers. As highlighted in the posters in Poster Session 2, oil spill research projects have aided the

Office of Emergency Management (OEM) in disseminating new guidelines for use in oil spills and have developed an object-oriented oil spill model.

EPA's site characterization and soil research key scientific questions include: (1) Has the full scope of chemical contaminants of concern been defined sufficiently, and can they be measured? (2) How can representative environmental samples accurately and effectively be collected and the results interpreted? (3) How do collaborative efforts with client offices advance the state-of-the-science in site characterization and monitoring while addressing vital research needs? (4) How might rapid and cost-effective immunoassay, bioanalytical, and other screening approaches be used for site characterization? and (5) How can bioavailability and metal speciation be assessed, and can alteration of speciation result in reduction of bioavailability? In addressing these questions, ORD applies leading-edge measurement science to expand the target list to emerging contaminants; develop nontargeted analytical techniques for uncommon contaminants; and improve standard methods by making them more robust, rapid, and cost effective. Additionally, researchers are developing rapid immunoassay and bioanalytical assessment techniques for the determination of risk from organic contaminants, demonstrating the relationship of metal speciation on bioavailability and reducing metal bioavailability in contaminated systems, and verifying *in situ* remediation to reduce bioavailability.

The challenge of ORD's mining research is to develop and demonstrate innovative, cost-effective technologies and approaches to restore the nation's lakes and rivers contaminated by mining wastes. ORD's approach is to collaborate with the U.S. Forest Service, the U.S. Department of Agriculture, the U.S. Department of the Interior, universities, EPA regional offices, and the private sector to provide solutions to mining impacts. The Mine Waste Technology and SITE Programs sponsor laboratory and field-scale research projects and demonstrate the effectiveness of applicable technologies.

The Technical Support Project, which includes the TSCs and the Hazardous Substances Technical Liaisons (HSTLs), was initiated by OSWER, ORD, and regional waste management offices in 1987 to provide technical assistance and directly involve ORD scientists in real sites with real problems. The TSCs are the interface for receiving requests from regional and program offices and are responsible for obtaining technical support. Technical support activities also serve to inform the ORD research program regarding the priority research questions to address to serve client office needs. The TSCs have been recognized numerous times for their valuable contributions to EPA regions. The HSTL Program was created in 1990 to expand technical support to regional staff and foster communication between ORD and EPA regions. There have been approximately 200 site-support efforts in the previous year.

Discussion

Dr. Siegrist asked if there was movement into new areas of groundwater research (e.g., drinking water impacts and energy-related issues). Dr. Puls responded that a recent research project did investigate groundwater and drinking water related to the new arsenic rule, which lowers the maximum contaminant level for arsenic in drinking water. This research focuses on the natural attenuation and mobilization of arsenic in aquifers supplying drinking water to municipalities. It was funded under the Drinking Water Program. Groundwater research crosses many different program areas, including the Water Quality and Ecosystem Restoration Program. The new Land MYP addresses groundwater/surface water interactions as a growth area, but energy-related issues are currently not addressed.

LTG 1: Poster Session 2

LTG 1 Poster Session 2, held in the Atrium area of the building, included 17 posters. Before the meeting, Dr. Menzie assigned two Subcommittee members to each poster for thorough review and evaluation. During the 90-minute poster session, each Subcommittee member also had the opportunity to ask questions about the research or clarify specific points with the presenter(s). Poster abstracts and a book of poster reproductions were provided to Subcommittee members before the meeting.

Discussion of LTG 2 Poster Session 2

Subcommittee Members

Dr. Siegrist commented that the researchers again were enthusiastic about their projects. The DNAPL in groundwater research appears to be mature, so he asked the investigators about the future of the research. Some researchers indicated that they were moving into different areas. He thought researchers need to explore new areas of research and that leveraging could have a synergistic effect on the research. He commented that he was impressed with the science and that it was good to view EPA's collaboration efforts. Dr. Keating commented that many of the research projects were technical support activities, which are very important. He added that there are opportunities to delve into deeper science. To further clarify, amplify, expand, and understand the scientific thinking, EPA needs to network within the Agency. Research needs can be addressed more quickly if science opportunities that can be answered by the total institution are brought to bear.

Mr. Thompson indicated that he saw a lot of enthusiasm and interesting research topics. The research appeared to be incredibly focused in that researchers identify a targeted research problem, focus on it, solve it, and then move to the next research problem. With no STAR grants available to support the program and the HSRC Program being eliminated, he has some concerns as to how EPA will supplement its technical support.

Dr. Menzie commented that good work was being carried out in the metals bioavailability and oil spills research. It is evident that there is cross-Agency collaboration in progress. The engineering technical support systems area has opportunities to work with other regions and agencies, which is a very strong feature of the program.

Dr. Clark stated that the HSRC and TSCs do great work. They have increased networking with success. A lot of procedures are in place regarding funding and priority research projects. He wondered if the decision to terminate the HSRC Program was a conscious decision because the program was mature. He was very impressed with these programs overall.

Mr. Phaneuf stated that the site characterization and soil research project leaders were very enthusiastic and knowledgeable. The work is peer-reviewed, useable, and of good quality.

Dr. Haber was tasked with reviewing the TSC liaisons to the regions. In questioning the researchers, she determined that all programs were stronger than they appeared on the posters. There is good customer service and internal and external peer review. The feedback aspect of support is emphasized.

Dr. Dellinger viewed a variety of different research projects: one basic research, one applied research, and two technical support. He was impressed with the competency of the researchers and commented that having the HSRCs at universities is a good idea. He would like to know what EPA plans to do when there are no HSRCs. Many researchers have acquired a good deal of expertise and their talent may be wasted if a firm plan is not in place for the future.

Dr. Bridges commented that there are many potential benefits to the soil and groundwater research. He would like more information on how progress is made in MNR. Much of the technology can be transferred between research groups, and he suggested that ORD organize internal workshops to share knowledge and resources. Cross-fertilizing of various efforts also was recommended. Additionally, EPA should focus on the commercial aspects of technology transfer. EPA should consider how to make the technologies it develops available to more individuals outside the Agency.

Working Session

Subcommittee Members

In a closed working session on Tuesday afternoon, the Subcommittee discussed details for completing their evaluation. Dr. Menzie stated that the report should be a series of responses to the major charge questions and subquestions. The Subcommittee needs to provide citations and examples to document its conclusions, drawn from the provided materials, information received at the face-to-face meeting, and from the members' own knowledge. Recommendations in the report should be in bold-face font. Dr. Menzie urged Subcommittee members to have their top four or five consensus points ready by Thursday for the initial draft of the report.

Dr. Clark stated that at the last BOSC Executive Committee Meeting, the BOSC received line-by-line comments and responses to the completed BOSC reviews from the appropriate EPA programs stating how each program would respond to the Subcommittee's recommendations.

Dr. Bridges shared his thoughts on the relevance of the research. He did not think that the MYP process was intuitive in the first reading and was concerned that the concept of innovation did not have more prominence in the document. He found that there were different levels of collaboration inside and outside of the Agency and wondered how this translated to the day-to-day research activities of ORD scientists.

Dr. Bridges stated that he was having difficulty understanding the difference between customers, clients, and stakeholders and asked Dr. Wentsel to comment. Dr. Wentsel wrote an explanation to help distinguish between the groups. Customers and clients essentially are the same entity. Stakeholders is "sloppy" terminology and generally is another word for customer, except in the context of the Superfund Program, where a stakeholder is a specific entity.

Dr. Haber commented that, in terms of relevance, she did not grasp fully how the MYP translated to specific projects until she reached the appendices. She was able to identify short-term research but did not see long-term research addressed. There was good cooperation and collaboration with many national and international organizations.

Dr. Menzie stated that as he reviewed the MYP, he recognized that a process had taken place to ensure that the MYP would be relevant. The content is present, but a more specific "roadmap" needs to be put in place to decrease confusion and ensure that the research goals are clear.

Mr. Thompson commented that the MYP was a good merge of the two previous MYPs, as the SAB had suggested. He would like to see strategic elements, emerging issues, and specific examples of leveraging addressed in the document.

In terms of the quality of the research, Dr. Keating found that there were no definitions, standards, reference, or performance metrics in the document. EPA researchers need to utilize the tools of the 21st Century (e.g., state-of-the-art laboratories, the Internet) to move the research vision forward. He asked if quality was a noun, verb, or adjective. Dr. Menzie responded that, when framed in the context of the subquestions, quality is defined in terms of awards and peer review. Mr. Thompson added that QA/QC is one definition of quality. He added that, in terms of peer review as a measure of quality, this program is performing well.

Mr. Thompson asked if there was a merit-based process to award external funds; he could find no information regarding this in the MYP. Dr. Wentsel responded that federal employees' salaries were paid off the top of the budget. In terms of extramural funding, laboratories and centers can use some of the funds for animal care, building maintenance, and so forth.

Dr. Haber commented that there was a difference among researchers as to how quality was measured. Some researchers queried customers for feedback on performance quality, and others looked at

dimensions of quality that were somewhat innovative and novel. She stated that sometimes it is possible to spend too many resources on QA/QC when those resources could be utilized to deliver products. Dr. Siegrist added that he has experienced first-hand that EPA is the most rigorous federal agency in demanding quality assurance for environmental research.

Dr. Dellinger stated that the MYP was clear and well-written, but he expressed concern about the goal for EPA to be recognized as a leader in environmental research. As much of EPA's research is internalized, he does not believe that EPA is achieving this status. Other agencies, such as the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, the DOE, and the NIEHS, have larger extramural research programs than EPA.

Dr. Siegrist expressed concern about the two LTGs. He was unsure if the LTGs as stated are the right goals for ORD and the Land Research Program. The vast majority of other programs have three to four LTGs that are problem driven, and this may be a good model to follow.

In closing the meeting for the day, Dr. Menzie thanked Dr. Wentsel for clarifying points and responding to Subcommittee members' questions. Dr. Menzie thanked the Subcommittee members for their perseverance and for responding to the review and evaluation tasks within a very limited time frame.

The meeting was recessed at 5:09 p.m.

WEDNESDAY, DECEMBER 14, 2005

Review of Tuesday's Activities and Overview of Today's Agenda

Dr. Charlie Menzie, Subcommittee Chair

Dr. Menzie opened the meeting at 8:30 a.m. with a review of Tuesday's activities and the revised schedule for the day. He then introduced Dr. Candida West, who provided an overview on the LTG 2 research projects.

LTG 2: Overview

Dr. Candida West, Acting Director of Research, Ecological Research Division, NERL, ORD, EPA

The two themes under LTG 2, resource conservation and materials management, were presented in the poster session within the risk assessment/risk management paradigm. The research performed within LTG 2 addresses customer needs and is considered high priority by the Office of Solid Waste (OSW). The two key science questions (i.e., determination of the risk associated with the materials and determination of appropriate dispositions for the waste material or stream) are designed to remain flexible. LTG 2 poster topics include multimedia modeling and uncertainty analysis, resource conservation, sustainable approaches to waste management, vapor intrusion, and underground storage tanks.

Research activities occurring under the resource conservation theme include the development of methods to sample and assess risks from waste-derived products, assessment of benefits from waste minimization, and development of enhanced multimedia modeling applications. ORD scientists are investigating how: (1) modeling technologies can be applied to inform increasingly complex regulation decisions; (2) model evaluation science can meet the demand for uncertainty analysis, sensitivity analysis, and parameter estimation to support model-based decisionmaking; (3) the reduction in risk and associated uncertainty resulting from ORD initiatives can be quantified to provide a program performance metric; and (4) a suite of tests and parameters can be selected that accurately will inform decisions about safe waste disposal conditions and safe secondary uses.

Research activities under the materials management theme include evaluation of the performance of various landfill liners; research on landfill bioreactor design, operation, and monitoring; and investigation of waste streams and reuse of materials. ORD waste containment systems research projects investigate how well cover and liner systems are performing and how they can be improved. ORD scientists are investigating how landfills can be operated in a manner to accelerate safely waste decomposition to minimize environmental risk while providing an alternative energy source. Another ORD research project examines what factors control emissions of dioxins, PAHs, particulate matter, and products from brominated flame retardants and if the mechanism and rate studies can lead to predictive models.

The vapor intrusion and underground storage tank research activities include development of characterization tools and vapor intrusion methods, as well as transport of underground storage tank fuel. One research project assesses the sources and effects of uncertainty in vapor intrusion screening models, and another project investigates what approaches can be utilized to characterize and control vapor intrusion. Underground storage tank research activities include determination of the best means to assess sites using appropriate site-specific risk evaluations; promotion of underground storage tank site closure by using active intervention for site cleanup; and establishment of what research is necessary to anticipate and avoid future problems of leaking underground storage tanks.

Discussion

Dr. Clark commented that he did not see research on resource conservation and waste minimization from the consumer side (i.e., sociology). Dr. West responded that the priority chemical reduction program is from the consumer side; there has been decreased use by the consumer. Dr. Wentsel added that resource conservation researchers are working with OSW to determine an acceptable collaboration. Green buildings and so forth are categorized under a different LTG. Regions often are closer to such issues, and partnering with the regions often is the best way to handle such research questions. Dr. West added that regions often partner with customers.

Dr. Menzie asked if EPA is partnering with other agencies on vapor intrusion. Dr. West replied that measurements were obtained from other divisions under a different LTG and most opportunities may be in conjunction with states.

Mr. Thompson asked if LTG 2 researchers took the SAB recommendations into consideration. Dr. Wentsel responded that the research focus shifted from resource conservation to materials management activities, and incorporating the SAB recommendations into the research priorities is an ongoing process.

Mr. Thompson asked if it was accurate that LTG 1 deals with the original Contaminated Site MYP, whereas LTG 2 deals with the former RCRA MYP. Dr. Wentsel responded yes to the question.

Dr. Keating commented that tanks and fluids in decommissioned military bases have different chemical compositions than are present in other commercial or industrial sites, and therefore the science of the penetration plume is different. He added that perhaps EPA should focus on this area. Dr. West responded that EPA had a program, in collaboration with DoD, to examine military jet fuel cleanup. Dr. John Wilson of NRMRL's GWERD stated that EPA has partnered extensively with DoD and has more knowledge about jet fuel than commercial fuel. He added that jet fuel is more benign to the environment than commercial fuel. Dr. Keating stressed that this expertise should be applied to base cleanups following decommissioning.

Dr. Siegrist asked about research related to disaster debris and if there is enough flexibility in the program to redirect efforts following a disaster such as Hurricane Katrina. Dr. West replied that some of the land research is applicable to cleanup of disaster debris, but ORD does not always have the luxury to redirect funds. She commented that she was unfamiliar with the EPA plans for responding to hurricanes and other disasters, but that issue may be addressed in other research plans.

LTG 2: Poster Session

The LTG 2 Poster Session was held in the Atrium area of the building. For this session, 12 posters were reviewed. Before the meeting, Dr. Menzie assigned two Subcommittee members to each poster for thorough review and evaluation. During the 2-hour poster session, each Subcommittee member also had the opportunity to ask questions about the research or clarify specific points with the presenter(s). Poster abstracts and a book of poster reproductions were provided to Subcommittee members before the meeting.

LTG 2 Poster Session Discussion

Subcommittee Members

Dr. Clark commented that there was a broad range of technical applications with many technical details. There was increased leveraging with other agencies and universities that produced high-quality, peer-reviewed, published communications.

Mr. Phaneuf stated that there was inspiring energy among the researchers, and the research has numerous and timely applications to real-world problems (e.g., mercury). He noted, however, that LTG 2 research appears to be lagging behind LTG 1 research, and LTG 2 research should be more mature and in line with the maturity of LTG 1 research.

Dr. Haber was impressed with the extensiveness of the uncertainty research. It is peer reviewed and some research can be applied to real-world problems in a fairly quick manner. Although much of the research appears relevant and timely, and the leveraging is satisfactory, there is a lack of sociology research. EPA should investigate leveraging for social science/sociology research.

Dr. Dellinger stated that the research he reviewed was innovative. He was impressed with the timeliness of the research and the highly leveraged projects. Other agencies have given EPA funding to conduct research in waste containment that is being applied to various sites across the United States.

In reviewing the vapor intrusion, model assessment, and modeling techniques research, Dr. Bridges saw a possible example of how to merge data collection with modeling efforts. He would like to see more integration of projects. Additionally, EPA should increase its investment in uncertainty research (e.g., modeling and guidance).

Dr. Siegrist found the researchers to be enthusiastic and well informed and the research to be well done. The research is anticipatory of future problems and results in tools for decisionmaking.

Dr. Keating commented that researchers should utilize “virtual” laboratories and cyber tools to decrease the cost of creation and maintenance of the research projects. A good example of virtual tools is the risk-based 3MRA effort. Using virtual laboratories can extend capabilities beyond the physical laboratory.

Mr. Thompson found the waste management and risk assessment projects to be very specific to the charge questions. These projects are relevant and on track with the EPA Strategic Plan. In looking at the future research, Mr. Thompson suggested that future MYPs address a schedule or plan for “sunsetting” research programs as they mature.

Dr. Menzie commented that several researchers made the effort to identify uncertainties and invest in uncertainty reduction. Although uncertainty analysis often is useful, it does not always go far enough. It is valuable to guide users and inform them as to where they can make their investment and allocate their resources. Dr. Clark advised that the Subcommittee should not concentrate on uncertainty so heavily because NCEA and other forums have been tasked with addressing uncertainty.

Dr. Menzie stated that the research is forward looking, and researchers appreciate the balance of immediate needs versus future needs. EPA may want to consider distributing technical support within both LTGs.

Following the lunch break, Dr. Menzie introduced Ms. Sally Gutierrez, who gave an overview of the ORD response to Hurricane Katrina.

ORD Response to Hurricane Katrina

Ms. Sally Gutierrez, Director, NRMRL, ORD, EPA

Ms. Gutierrez gave a very brief overview of ORD efforts in response to Hurricane Katrina noting that the topic easily could be the subject of an entire workshop itself. Cleanup efforts currently are focused on the estimated 22 million cubic yards of debris in Southeastern Louisiana, including more than 30 million pounds of spoiled meat and 600,000 damaged or destroyed residential structures.

For environmental and debris management, EPA's Emergency Operations Center (EOC) requested an ORD review of sampling plans for contaminated sediments and water, and ORD provided guidance on sampling schemes. Additionally, EOC requested an ORD review for debris management plans from Regions 4 and 6 and the States of Louisiana, Mississippi, Alabama, and Florida. ORD's comments were taken seriously and incorporated as sampling schemes moved forward. For treatment of floodwaters, EPA's Office of Water requested ORD assistance, in an advisory role, to evaluate strategies for treating contaminated floodwaters (e.g., pumping to Lake Pontchartrain vs. the Gulf of Mexico). The U.S. Army Corps of Engineers had the lead for overseeing the floodwater treatment and used the silt curtain approach recommended by ORD. The Federal Emergency Management Agency (FEMA) relocated displaced residents from hotels and tents into trailers near their original homes. When EPA raised concerns about contaminated sediments in these areas, FEMA took the guidance seriously and relocated the trailers to less contaminated areas.

To date, the largest technical assistance request to ORD in regards to Hurricane Katrina is the Office of Enforcement and Compliance Assurance's (OECA) request for ORD assistance and guidance to respond to the Louisiana Department of Environmental Quality's (LDEQ) request for a temporary waiver of the National Emissions Standards for Hazardous Air Pollutants for asbestos so that it could perform limited demolition and disposal of asbestos-containing waste in four Louisiana parishes. In response, ORD developed the *Approach for Conducting Source Emission Characterization Tests of Open Burning of Vegetative and Demolition Debris* document, which then was reviewed by the SAB. ORD incorporated the SAB comments, and OECA included ORD's sampling plan with the temporary waiver it granted the LDEQ.

Additionally, ORD has ongoing research in other programs that is relevant to Hurricane Katrina. One such research project is the development and evaluation of moisture-resistant building products. A New Orleans hotel in the flood zone that was being built with this material had no mold or water damage during Hurricane Katrina and its aftermath. As the debris from a 450-room hotel can contain 2.5 million pounds of gypsum alone, the savings in cost, replacement, and environmental effects is significant.

Discussion

Dr. Dellinger asked if the results of EPA testing for the Hurricane Katrina response are available on the EPA Web Site. Ms. Gutierrez responded that all results were posted on the EPA Web Site. Dr. Wentzel indicated that he would provide the specific Web site address to the Subcommittee members.

Dr. Bridges asked what lessons had been learned from a coordination standpoint. Ms. Gutierrez responded that the Agency learned that EPA and other agencies could have been more prepared. As a result, ORD now has procedures in place for future events.

Dr. Menzie introduced Dr. Lee Hoffman, who provided an OSWER perspective of the Land Restoration and Preservation Research Program.

Office of Solid Waste and Emergency Response Perspective

Dr. Lee Hofmann, Senior Science Advisor, OSWER, EPA

Dr. Hofman thanked ORD for the opportunity to speak, expressed her appreciation for the Subcommittee members' service, and stated that she looked forward to reading the Subcommittee's recommendations.

OSWER is organized into several offices, including the Immediate Office of the Assistant Administrator, which in turn is responsible for the Federal Facilities Reuse Office and revitalization programs that involve small workgroups that study crosscutting issues (e.g., watersheds, land). The revitalization groups represent a cooperative effort between OSWER and ORD. Because OSWER is confronted with complex issues that require a wide range of scientific and technical expertise, OSWER often partners with ORD to help it achieve its mission. OSWER and ORD have collaborated on numerous research topics, including contaminated sediments, groundwater contamination, multimedia contamination, oil spills, resource conservation, and materials management.

Under OSWER, OSW has had a past emphasis on regulatory approaches, but a recent shift has emphasized on the recycling-resource conservation challenge, a life cycle approach, and voluntary programs. ORD has supported OSW by vetting a new biotransfer factor method and assisting with multimedia model development (e.g., 3MRA). ORD has provided support for OEM, another office under OSWER, by assisting with Hurricane Katrina cleanup and an analysis of lessons learned from the disaster, creating a "red team" of technical experts for emergency response, performing systematic studies of decontamination systems, and developing rapid detection systems. ORD has provided technical support for OEM through support of National Decontamination Team exercises, participation in the Foreign Animal Disease Working Group, and provision of Web-based guidance on safe disposal of decontaminated wastes.

ORD supports OSWER's Office of Underground Storage Tanks by providing models and techniques for underground storage tank site closures. ORD supports OSWER's Office of Brownfield Cleanup and Redevelopment through ORD's Web-based decision support tool, SMARTe, as well as its predictive modeling of metal transport for use at abandoned landfill sites. ORD also provides risk assessment and risk management support to all OSWER offices. Additionally, ORD contributes to all OSWER regulatory workgroups to ensure consistency and sound science. ORD's varied support is invaluable to allow OSWER to meet its mission.

Discussion

Dr. Haber commented that, from the program office perspective, it appeared that there was a shift to resource conservation and voluntary programs. She asked if OSWER views leveraging as useful in terms of behavioral research. Mr. Tim Taylor of OSWER responded that leveraging is considered useful, and OSWER is aware of such a need.

Dr. Haber stated that rapid detection systems have homeland security applications, and asked how the establishment of EPA's National Homeland Security Research Center (NHSRC) has changed the support received from ORD. Dr. Hofmann responded that it is challenging working with NHSRC, but OSWER will continue to collaborate with ORD scientists in addition to its collaboration with NHSRC.

Dr. Menzie introduced Dr. Elizabeth Southerland, who outlined the collaboration between OSRTI and ORD.

Office of Superfund Remediation and Technology Innovation Perspective

Dr. Elizabeth Southerland, Director, Assessment and Remediation Division, OSRTI, EPA

OSRTI is divided into three divisions, two of which work closely with ORD. The Technology Innovation and Field Services Division works with ORD on technology transfer, and the Assessment and Remediation Division oversees the Superfund Program. OSRTI has several performance measures, including final site assessment decisions, efficiency measures, and site reuse determinations. To achieve these measures, OSRTI looks to ORD for short- and long-term research and technical support. OSRTI and ORD coordinate research planning via regional prioritization, land RCT discussions, mutual feedback from headquarters and regions, MYP development, and research needs compilation. These steps provide much dialogue and discussion between the various components of the process.

In assessing its research needs, OSRTI receives input from its Science Policy and Technical Innovation Branches, Regional Superfund Divisions, the Regional Science Council, the Groundwater and Engineering Forums, the Contaminated Sediment Technical Advisory Group, the Risk Assessment Forum, and the Ecological Risk Assessment Forum. The research needs identified by these groups are prioritized by OSRTI and Regional Research Advisory Groups. To make the resulting research results accessible, ORD assists by organizing seminars and training courses; participating in National Association of Remedial Project Managers meetings; providing fact sheets, summary reports, and Web postings; and communicating directly with HSTLs. OSRTI utilizes the results via site support applications (e.g., TSCs and individual site-specific support) and indirect site applications (e.g., technology and guidance development, model development and validation, and toxicity value establishment).

ORD participates in two Superfund Review Boards: (1) the National Remedy Review Board, which reviews all site remedies greater than \$25 million; and (2) the Contaminated Sediments Technical Advisory Group, which provides oversight of large and complex sediment sites. The research and technical support that ORD provides to OSRTI is critical to innovative technology development and effective characterization and cleanup of Superfund Sites.

Discussion

Dr. Dellinger stated that the Ninth Ward in New Orleans, which was flooded as a result of Hurricane Katrina, is on a Superfund site, and PAHs have been found in sediments and floodwaters. He asked what efforts OSRTI was putting forth in this matter. Dr. Southerland responded that OSRTI has not completed the final plan. The monitoring and sampling program has been peer reviewed, and all Superfund sites affected by Hurricanes Katrina and Rita have been checked; the information is available on the EPA Web Site. The next step is to identify hot spots and proceed from there.

Dr. Bridges asked about the priorities for Superfund/ORD interactions. Dr. Southerland responded that OSRTI always is focused on the top two or three research priorities. ORD uses Superfund monies for FTEs and investigates which experts can be utilized for the highest priority research projects.

Dr. Menzie introduced Dr. Andrea Leeson, who presented an overview of DoD's Environmental Technology Programs.

Research Partner Collaboration

Dr. Andrea Leeson, Environmental Restoration Program Manager, SERDP/ESTCP, DoD

The environmental drivers of DoD's Environmental Technology Programs are the sustainability of ranges and range operations (e.g., maritime sustainability, toxic air emissions and dust, unexploded ordnance) and reduction of current and future liability (e.g., contamination from past practices, life cycle costs). The SERDP Program is a joint program between EPA, DOE, and DoD. The SERDP Council, with members

from each agency, governs the SERDP SAB, Executive Working Group, and Technology Thrust Area Working Groups. The SAB is an independent board comprised of academia, industry, and nongovernmental organization representatives. The working groups each contain members from the three contributing agencies.

Each SERDP committee (e.g., Army, Navy, Air Force, DOE, EPA) determines its research needs and generates its statement of needs. The statements of needs then generate proposal solicitations, which in turn result in funded projects. The SERDP Review Committee assists with identification of research needs, selection of solicited proposals for funding, ongoing review of projects for technical quality, and transfer of technology within each agency. Research areas for SERDP include sustainable infrastructure, munitions management, environmental restoration, and weapon/platform management. Within these areas, different decision and modeling tools are developed.

The topic areas under ESTCP are much more broad than SERDP topic areas and are focused on DoD needs, including cleanup, unexploded ordinance, pollution prevention, and compliance. Solicitations for topic area identification are released once per year. SERDP and ESTCP technology transfer strategies are Web-based and include fact sheets, final reports, miscellaneous documents, and—in the case of ESTCP—a cost and performance report. SERDP and ESTCP program offices provide outreach about technology transfers via final debriefs/teleconferences, information booths at conferences, presentations, and published articles. In the case of principal investigator (PI) led technology transfer, publications and presentations are encouraged highly, and all publications are entered into the SERDP online reporting system.

EPA also interacts with the SERDP and ESTCP Programs through participation in the Federal Remediation Technologies Roundtable and the Interstate Technology and Regulatory Cooperation Workgroup. Several SERDP and ESTCP PIs are working with EPA workgroups on a variety of projects. Additionally, EPA scientists are PIs or co-PIs on the following SERDP projects: (1) Aquifer Restoration by Enhanced Source Removal; (2) Impacts of DNAPL Source Zone Treatment; and (3) Characterization of Contaminant Migration Potential Through In-Place Sediment Caps. The Web site addresses of the SERDP and ESTCP programs are <http://www.serdp.org> and <http://www.estcp.org>, respectively.

Discussion

Dr. Dellinger asked about the agency that employs the SERDP/ESTCP staff, the funding sources, the amount of the funding, and the number of projects. Dr. Leeson responded that SERDP/ESTCP staff are employed by the Office of the Secretary of Defense, the funding is obtained from DoD, the yearly budget for SERDP and ESTCP are \$65 million and \$35 million, respectively, and there are approximately 400-450 active projects.

Dr. Clark asked about the average length of the projects. Dr. Leeson responded that most (approximately 80%) projects were approximately 3 years in length, but high-risk projects were funded for 1 year and \$100,000. A small percentage of projects are 5 years in length.

Dr. Clark asked how many projects investigate emerging contaminants. Dr. Leeson responded that emerging issues are a priority (e.g., perchlorate in 2006).

Mr. Thompson asked if the funding went directly from DoD to EPA. Dr. Leeson responded that this was the case. Mr. Thompson followed up by asking how this situation affects EPA's bottom line. Dr. Wentsel responded that this funding was independent of the FTEs and budget described in the MYP.

Dr. Bridges asked how ORD facilitated/encouraged its scientists to perform SERDP/ESTCP projects in addition to their ORD research. Dr. Puls responded that individual PIs must compose proposals that address the needs of SERDP and allow them to broaden the scope of their own research projects. A

participant added that SERDP and EPA share information on research endeavors so that there is not duplicated effort in the leveraging of resources.

Dr. Menzie introduced Dr. Harry Ball, who gave a regional perspective of the Land Research Program.

Regional Perspective

Dr. Harry Ball, Technical Support Team Leader, Superfund Division, EPA Region 9

Superfund cleanup involves a range of activities, including enforcement, financial accountability, public and political involvement, and technical issue identification and resolution. Remedial Project Managers (RPMs), the managers of Superfund site remediation, receive technical support from their own expertise, consultants, and ORD experts. Because informed decisions need sound science, suboptimal decisions are made when technical support is limited. One example of this is the Leviathan sulfur mine in California, where the first project to control seepage from the Aspen Seep failed. ORD scientists were consulted, and their expertise led to the installation of a successful bioreactor that operates year-round. The sound science of ORD convinced the potentially responsible parties to invest in the project.

Regional offices utilize ORD expertise for site-specific technical support, technology development and transfer, risk assessment, and emerging issues response. The TSCs are the key to using science to achieve outcomes in EPA regions. HSTLs are the face of ORD in the regions and link regional staff to ORD experts. ORD has supported regional efforts to manage risk communication issues. ORD was of great assistance in helping the regions, particularly Region 8, to develop vapor intrusion guidance documents. Additionally, ORD was proactive in allowing Regional Advisory Workgroups to provide input in the MYP planning process.

The future challenges that the regions face are to maintain a capable and responsive research program with a decreasing budget and to add to the technology toolbox so that challenging sites may be addressed.

Discussion

Dr. Bridges observed that in working with RPMs, in some cases there has been an overreliance on consultants and there is merit in getting ORD scientists involved with these projects so that there can be increased honesty in project evaluations. Dr. Ball agreed that RPMs and consultants are generally risk adverse, whereas ORD scientists can get involved with several sites across the nation and offer more informed expertise at each individual site.

Dr. Clark asked Dr. Ball to identify the posters from the poster sessions that would help regions address the future challenges mentioned in this presentation. Dr. Ball responded that many of the posters demonstrate that ORD is working on research projects that will help the regions meet future challenges.

Dr. Keating asked what expertise was provided on the Leviathan project by ORD scientists that could not have been provided by any environmental engineering consultant. Dr. Ball responded that he was not the best person to answer the question, but he did know that the RPM on the project was impressed with the world-class expertise of the ORD researchers. ORD research has the benefit of having a broader scope and being able to synthesize problems and challenges from a national perspective.

Dr. Menzie asked if Dr. Ball knew the perspectives of other regions. Dr. Ball responded that he has interacted with various personnel from many regions, and he was comfortable stating that his views are fairly representative of other regions.

Dr. Menzie introduced Ms. Beth Anderson, presenting on behalf of Dr. William Suk.

Research Partner Collaboration

Dr. William Suk, Director, SBRP, NIEHS

Presented by Ms. Beth Anderson, Program Analyst, SBRP, NIEHS

The SBRP was established in 1986 under the SARA legislation and was legislated to be a university-based grants program administered by NIEHS and intended to complement EPA and Agency for Toxic Substances and Disease Registry (ATSDR) research. The mission of the SBRP is to acquire new scientific and engineering knowledge that advances society's understanding of the human and ecological risks from hazardous substances and the development of new environmental technologies for the cleanup of Superfund sites. SBRP research encompasses 20 multiproject grants, approximately 600 investigators and 200 graduate students, and a \$50 million budget. The program provides multi- and interdisciplinary research for improving public health.

The SBRP researches almost any aspect of scientific and intellectual inquiry and methodology that is directly related to: (1) understanding the relationship between exposure to hazardous substances and human health; (2) examining impacts of hazardous substances on ecosystems; (3) developing strategies to understand the physical, chemical, and biological processes affecting chemicals in environmental media; and (4) developing methods and approaches to reduce effectively the amount and toxicity of hazardous substances. The prioritization planning is an ongoing process that continually calls for input from the scientific community and partners (i.e., EPA, ATSDR, and states).

The components of the SBRP include research, training, outreach, research translation, communication, conferences, SBIR/Small Business Technology Transfer, and partnerships. SBRP training supports graduate students and postdoctoral fellows, and encourages PIs to include training in the main grant, as there are no separate training grants. Grantees must have a research translation core in their grant proposals, which then guarantees they will connect with SBRP partners (e.g., EPA). The SBRP SBIR Program is coordinated with EPA's SBIR Program.

The differences between the SBRP program and EPA's Superfund Program are as follows: (1) the SBRP is basic research with longer term goals, whereas EPA's Superfund Program is applied, problem-driven research; (2) SBRP research is carried out at U.S. universities, whereas Superfund research is conducted at national laboratories; (3) SBRP research has a strong focus on human health, whereas Superfund research is focused on environmental sciences; and (4) the SBRP provides research translation and outreach, whereas the Superfund Program provides TSCs and regional liaisons.

An MOU to improve collaborations and coordination between ORD and the SBRP was implemented. Under the MOU, EPA and the SBRP meet at least annually, identify research ready for transfer from laboratory to demonstration, seek opportunities to cosponsor research conferences, share research plans (e.g., MYPs), and exchange research findings. The most important highlight of the collaboration is the coordination of research agendas to enhance complementary, cooperative research. Additionally, EPA also is included in each step of the NIH peer-review grant award process. The SBRP also provides tools for ORD use, including monthly research briefs, risk e-learning, peer-reviewed publications, site-specific applications, scientific expertise, grantees' knowledge, and the SBRP Web Site.

Protection of human health and the environment depends on a better understanding of the routes, effects, and prevention of exposure. The SBRP and EPA collaboration allows coordination of efforts to address these issues and provides the impetus to move basic research to the point where it can be applied and utilized.

Discussion

Dr. Dellinger asked how the SBRP coordinated its efforts with the Centers for Disease Control and Prevention (CDC) in response to Hurricane Katrina. Ms. Anderson responded that the Hurricane Katrina

cleanup efforts were an NIEHS effort versus an SBRP effort; however, NIEHS staff did coordinate with the CDC in developing a research agenda.

Dr. Dellinger asked who at EPA (e.g., program offices or regional offices) is solicited for input. Ms. Anderson responded that the Director of OSRTI and the NPD for Land were sent the developed Requests for Applications for comment and feedback. EPA regions also are asked to provide input as to long-term research needs. The SBRP then utilizes these inputs to develop its basic research goals.

Dr. Siegrist asked how much of the SBRP SBIR is basic human health research versus technical or treatment tool development. Ms. Anderson responded that grantees must propose multiple projects that include three biomedical projects and one nonbiomedical project to qualify for funding. Her estimate is that approximately 60 percent of the grants involve focus on research related to human health outcomes.

Dr. Siegrist asked if researchers must be at a university with an associated medical school or school of public health. Ms. Anderson responded that this is not required; however, many programs are associated with schools of public health.

Dr. Bridges asked if the program emphasis on human health was mandated by legislation. Ms. Anderson responded that the mandates place strong emphasis on human health and because this program has been assigned to NIEHS, the need for a focus on human health was interpreted.

Dr. Bridges asked if the research program was static or if EPA could influence the research priorities. Ms. Anderson replied that the program is dynamic and evolving and open to input from EPA; however, it is assumed that it will continue to focus strongly on human health research.

Dr. Haber asked how the required research translation core transforms projects from basic to applied science without a risk assessment component. Ms. Anderson responded that grantees may perform risk assessment evaluations in their research program.

Public Comments

Ms. Drumm informed participants that no one had contacted her to request time to speak during this period allotted for public comments and questions.

Dr. Menzie then opened the floor for comments from EPA participants.

EPA Comments

Dr. Wilson stated that relevant science matters can take research from the laboratory to the field; it is not necessarily a funding or budget issue.

Dr. Steve Schmelling commented that funding and budget issues are not minor considerations, because funding gives access to sites and supports field work by providing funds to travel to contaminated sites. Supplemental funding is critical to perform field research.

A participant stated that although the SBRP has provided some funds for ORD and Region 9 research, many ORD researchers are supported by the HSRC/HSTL Programs. These programs and researchers are valuable, and EPA should continue to support the HSRC Program.

Dr. Menzie thanked EPA personnel for their input and asked Dr. Wentzel for closing comments.

Office of Research and Development Wrap-Up

Dr. Randy Wentsel, National Program Director for Land, ORD, EPA

Dr. Wentsel thanked each presenter for taking time out of their busy schedules and presenting their perspectives for the Subcommittee members. He the ORD PIs and the team the worked to present materials to the BOSC. ORD is looking forward to the Subcommittee's report and recommendations.

Dr. Menzie added that the Subcommittee members appreciated all of the organizational effort that it took to assemble the materials and make the presentations.

Working Session

Subcommittee Members

The Subcommittee members agreed to work on the report that evening and submit changes to Dr. Menzie, who would incorporate all changes and develop a master working draft for distribution to the members on Thursday morning. The Subcommittee members determined their respective writing assignments.

Dr. Dellinger expressed his concern that the goals of the two LTGs appear to be the same. Dr. Keating wondered if the program uses peer review to ensure the quality of the product. In the language of the MYP, "product" and "goal" seem to be used interchangeably. Dr. Siegrist commented that some questions could not be answered until the terms "timely" and "significant" are defined. Dr. Bridges added that because metrics were not expressed, there is no context for the terms timely and significant. Mr. Phaneuf added that timely and significant are qualifiers and, although that must be considered, the science questions can be addressed by the research.

Dr. Menzie commented on the disparity between LTG 1 research and LTG 2 research. Mr. Phaneuf commented that the disparity did not seem as vast as he had thought originally. LTG 1 comes out of a mature program, whereas LTG 2 is a newer program and therefore has not had the chance to mature as has LTG 1. Dr. Siegrist added that LTG 2 was funded (e.g., monetarily and in FTEs) almost as well as LTG 1 in the previous fiscal year. Mr. Phaneuf responded that EPA needed to increase its outputs in LTG 2 because otherwise, each state would each implement its own program without national guidance, causing a disparity between state programs.

The Subcommittee members agreed that the development of performance metrics needs to be addressed. Dr. Dellinger and Mr. Phaneuf agreed that the lack of metrics in the MYP made it difficult to assess the progress of the Land Research Program and that it was only possible to make an assessment after talking to the PIs. Dr. Menzie commented that a recommendation could be made to include that information in the MYP.

Several Subcommittee members found that the guarantee of a paycheck may stifle the innovativeness of researchers. Dr. Bridges stated that incentives should be provided so that researchers internally compete for innovative ideas and research projects. Mr. Thompson commented that in a system where research needs are client driven, it may be difficult to implement internal competition.

Dr. Menzie asked the Subcommittee members to consider what the MYP accomplishes: a broad overview of how the pieces of the research program fit together but without the substantive details. He added that the MYP needs to be able to be communicated; currently, it is difficult to read and interpret.

The meeting was recessed at 5:55 p.m.

THURSDAY, DECEMBER 15, 2005

Working Session

Subcommittee Members

The Subcommittee members assigned to the various sections of the report used the first segment of the working session to revise their portions of the evaluation report.

Subcommittee members summarized their section of the evaluation report, commented on the evaluation report sections completed by other Subcommittee members, collaborated with their workgroups on the language and structure of their assigned sections of the report, reached consensus on areas of disagreement, and exchanged information to assist overall preparation of the Subcommittee's report.

Debriefing and Oral Reports on Charge Questions

Subcommittee Members

In debriefing EPA staff, Dr. Menzie summarized the Subcommittee's preliminary responses to the charge questions. He stated that the overviews and poster presentations were informative and helpful, and the Subcommittee members praised the quality and content of the poster presentations, as well as the enthusiasm of the scientists. Several themes emerged as the Subcommittee members discussed the Land Restoration and Preservation Research Program, including: (1) the content and communication of the Land MYP; (2) opportunities and incentives for collaboration and leveraging; (3) the key role of the TSCs; and (4) long-term planning considerations, such as building research capability for the future through staff and addressing emerging issues or longer term challenges. The overarching issues that need to be addressed are articulation of goals, overall communication, and the implications of terminating some research efforts/programs.

Relevance

Drs. Bridges, Haber, and Menzie

Question 1: "Is the research program relevant to and consistent with Agency goals, customer needs, and is it sufficiently flexible?"

Response: The Subcommittee believes that the Land Restoration and Preservation Research Program is very relevant to current research needs. The Subcommittee, however, has a number of caveats and suggestions on how to add substance to goals and objectives, as well as suggestions on how to reach out beyond the organization and "incentivize" collaboration.

Quality

Drs. Haber and Keating and Mr. Thompson

Question 1: "How is quality ensured in the awarding of research funds and in the quality of research products?"

Response: The quality of the research is apparent, and the prioritization process is evident. The Subcommittee members thought, however, that there was not enough information in the MYP or supporting materials to answer some parts of the question (e.g., competitive, merit-based process). It is not evident how adjustments are made midcourse, particularly for extramural grants. The Land MYP could improve the description of feedback loops that exist with the regions, which could be used to ensure quality during the conduct of the work.

Performance

Drs. Siegrist and Dellinger and Mr. Phaneuf

Question 1: “Is the research program design logical and appropriate?”

Response: The Land Program generally has a logical and comprehensive design for research to work toward producing knowledge, know-how, and decision-support tools to address and mitigate known, current problems (e.g., remediation of leaking underground storage tanks, remediation of DNAPLs in groundwater, risk assessment and remediation of contaminated sediment sites) and contribute to the LTGs of the MYP. The organization of research projects by elements of the risk assessment/risk management paradigm is reasonable, but organizing the work being completed by the numerous annual performance goals (38) and annual performance measures (140) in Table 4 of the Land MYP does not reveal a clear schedule for workflow to an endpoint. The MYP describes how research needs are identified and activities are prioritized and how work progresses, but it is unclear if and how in-progress reviews and go/no-go decision points are employed.

Question 2: “Is the research program making timely progress in addressing key scientific questions and LTGs?”

Response: The Land Program appears to have done an excellent job of coordination and communication (e.g., expert panels, coordination teams, research publications, technical support); however, there is an apparent gap in the MYP concerning longer term research and visionary thinking. Projects and activities that confidently will yield results in 1 to 2 years appear favored. Additionally, the Subcommittee expected to see more parity between the outcomes of LTG 1 and LTG 2; the outputs for LTG 2 seem to be lagging behind program needs.

Scientific Leadership

Mr. Thompson and Drs. Bridges and Keating

Question 1: “Is ORD playing a leadership role in Land research and effectively collaborating with the larger research community?”

Response: Overall, the Land Restoration and Preservation Research Program and the staff assembled to conduct the research provide leadership to the clients, stakeholders, and the scientific community. Examples of this include the contaminated sediment fate and transport research, MNR and capping in contaminated sediments, and the models developed for human health exposure (e.g., IRIS, 3MRA). For other projects where this is less clear, EPA may benefit by identifying and collaborating with experts outside the Agency. The Subcommittee recommends that, as part of the MYP, EPA identify growing and sustaining capabilities as a clear goal.

Dr. Menzie closed the meeting by stating that the Subcommittee’s overall impression of the work being done by EPA in the area of land restoration and preservation is very positive.

The meeting was adjourned at 2:45 p.m.

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APPENDIX 1:

Meeting Agenda

**U.S. EPA BOARD OF SCIENTIFIC COUNSELORS
Land Preservation and Restoration Subcommittee**

**MEETING AGENDA
December 13 - 15, 2005**

**U.S. Environmental Protection Agency
Office of Research and Development
Andrew W. Breidenbach Environmental Research Center
26 W Martin Luther King Drive
Cincinnati, OH**

**Presentations and Discussions in the Auditorium
Poster Sessions in the Annex Atrium**

Tuesday, December 13, 2005

8:00 a.m. Registration

Session 1: Welcome and Overview

8:30 a.m. Welcome and Opening Remarks Dr. Charlie Menzie
Chair, Land Subcommittee
Dr. Jim Clark
Vice-Chair, Land Subcommittee

8:40 a.m. DFO Welcome and Charge Ms. Heather Drumm
Designated Federal Official, ORD

8:45 a.m. ORD Welcome Dr. William Farland
Acting Deputy Assistant
Administrator for Science, ORD

9:05 a.m. Overview of the Land Research Program Dr. Randy Wentsel
National Program Director,
ORD Land Research

Session 2: Land Research Program Long Term Goal 1

9:25 a.m. LTG 1: Overview Dr. Patricia Erickson
Assistant Laboratory Director,
NRMRL, ORD

10:00 a.m. LTG 1: Poster Session I (Atrium) Land Subcommittee

11:30 a.m. Poster Session Discussion Land Subcommittee

12:00 noon Lunch

1:15 p.m.	LTG 1: Poster Session II Overview	Dr. Robert Puls Director of Research, GWERD, NRMRL, ORD
1:55 p.m.	LTG 1: Poster Session II (Atrium)	Land Subcommittee
3:25 p.m.	Poster Session Discussion	Land Subcommittee
4:00 p.m.	Working Time for Panel	Land Subcommittee
5:00 p.m.	Recess	

Wednesday, December 14, 2005

8:30 a.m.	Review of Yesterday's Activities Overview of Today's Agenda	Dr. Charlie Menzie Chair, Land Subcommittee
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Session 3: Land Research Program Long Term Goal 2

9:00 a.m.	LTG 2: Overview	Dr. Candida West Acting Director of Research, ERD, NERL, ORD
9:30 a.m.	LTG 2: Poster Session (Atrium)	Land Subcommittee
11:30 a.m.	Poster Discussion	Land Subcommittee
12:00 noon	Lunch	

Session 4: Other Perspectives

1:00 p.m.	ORD Response to Katrina	Ms. Sally Gutierrez Director, NRMRL, ORD
1:15 p.m.	Office of Solid Waste and Emergency Response Perspective	Dr. Lee Hofmann Senior Science Advisor, OSWER
1:35 p.m.	Office of Superfund Remediation and Technology Innovation Perspective	Dr. Elizabeth Southerland Director, Assessment and Remediation Division, OSRTI
1:55 p.m.	Research Partner Collaboration	Dr. Andrea Leeson Environmental Restoration Program Manager, SERDP/ESTCP, DoD
2:15 p.m.	Break	
2:25 p.m.	Regional Perspective	Dr. Harry Ball Technical Support Team Leader, Superfund Division, Region 9

2:45 p.m.	Research Partner Collaboration	Ms. Beth Anderson Program Analyst, Superfund Basic Research Program, NIEHS
3:05 p.m.	Public Comments	
3:15 p.m.	ORD Wrap-Up	Dr. Randy Wentsel National Program Director, ORD Land Research
3:25 p.m.	Working Time for Panel	Land Subcommittee
5:00 p.m.	Recess	

Thursday, December 15, 2005

8:30 a.m.	Working Time for Panel (with working lunch)	Land Subcommittee
2:30 p.m.	General Report-Out	Dr. Charlie Menzie Chair, Land Subcommittee
3:00 p.m.	Adjourn	

LAND RESTORATION AND PRESERVATION RESEARCH PROGRAM REVIEW

List of Themes and Poster Titles

LONG-TERM GOAL 1, SESSION A	
Contaminated Sediments	
Contaminated Sediments Sampling, Transport and Fate Research	Earl Hayter
What Are the Risks Associated with Sediment Contamination?	Lawrence Burkhard
Dredging Research and Assistance at Contaminated Sediment Sites	Barbara Bergen
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Innovative Risk Management Options for Characterizing and Remediating Contaminated Sediments	Kirk Scheckel
What are the Implications of Monitored Natural Recovery and Capping at Contaminated Sediment Sites?	Marc Mills
Contaminated Sediment Research and Technical Outreach at the South and Southwest Hazardous Substance Research Center	Danny Reible
Exposure and Risk Assessment	
Approaches, Model & Tools to Evaluate and Support Risk Reduction at RCRA and Superfund Sites	Mike Dellarco
Research and Application of Methods for Assessing Risks and Remediating Sites Associated with Exposure to Lead	Rob Elias
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Environmental Research Grant Program	
Hazardous Substances Research Centers; A Grants Program for Hazardous Waste Research and Technical Outreach	Mitch Lasat
What Tools Can Be Developed to Stimulate the Revitalization of Brownfields?	Ed Bouwer
Superfund Innovative Technology Evaluation	
Accomplishments of the Superfund Innovative Technology Evaluation (SITE) Demonstration Program	Randy Parker
Technical Support Centers	
EPIC - The Environmental Photographic Interpretation Center: EPA's Eye in the Sky	Don Garofalo
Technical Support Center for Monitoring and Site Characterization	Gareth Pearson
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Ecological Risk Assessment Support Center (ERASC): Assessing Complex Superfund/RCRA Ecological Issues	Mike Kravitz
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Groundwater	
Monitored Natural Attenuation for Remediation of Contaminants in Ground Water	Robert Ford

DNAPL Source Zone Remediation	Lynn Wood
Bioremediation of Chlorinated Solvent-Contaminated Groundwater	Lewis Semprini
ORD DNAPL Remediation Research Strategy	Lynn Wood
Permeable Reactive Barrier Research: Developing Cost-effective Technologies for Restoring Ground Water Resources	Rick Wilkin
Oil Spills	
Transport and Fate of Oil Plumes After They Have Been Treated with Chemical Dispersing Agents.	Jim Weaver
Protocol Development for Testing and Screening Commercial Oil Spill Remediation Products.	Al Venosa
Site Characterization/Soil Research	
Innovations in Soil Sampling and Data Analysis.	Brian Schumacher
Identifying and Measuring an Expanded Array of Chemical Contaminants	Ed Heithmar
Advancing Site Characterization and Monitoring Through Client Collaborations	Brian Schumacher
Rapid Bioanalytical and Immunoassay Assessment Techniques for the Determination of Organic Contaminants	Jeanette Van Emon
STAR Research Grants for Site Characterization, Assessment, and Monitoring	Katherine Banks
Metal Speciation and Bioavailability – Are they Important in the Risk Assessment/Risk Management Paradigm?	Kirk Scheckel
Mining	
What Innovative Approaches Can Be Developed for Mining Sites?	Ed Bates
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Ground Water Technical Support Center	Dave Burden
Engineering Technical Support Center	Dave Reisman
Hazardous Substances Technical Liaison (HSTL) Program	Ken Sala
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Multimedia Modeling and Uncertainty Analysis	
3MRA: A Multi-media Human and Ecological Modeling System for Site-specific to National Scale Regulatory Applications	Gerry Laniak
Model Evaluation Science to Meet Today's QA Requirements for Regulatory Use: Addressing Uncertainty, Sensitivity, and Parameter Estimation	Justin Babendreier
Vapor Intrusion	
Assessing Sources and Effects of Uncertainty in Vapor Intrusion Screening Models	Jim Weaver
What Approaches can be Used to Characterize and Control Vapor Intrusion?	Dom DiGiulio
Resource Conservation	
A Comparative Risk Reduction Analysis of OSW's Waste Minimization Priority Chemicals Initiative Using the 3MRA Multimedia Modeling System	Justin Babendreier

Evaluating Waste Disposal and Reuse for Metal Mobility	Souhail Al-Abed
Sustainable Approaches to Waste Management	
Waste Containment Systems Research	Steve Rock
Municipal Solid Waste Landfills as Bioreactors	Thabet Tolaymat
Air Toxic from Waste Combustion	Brian Gullett
Underground Storage Tanks	
What are the Best Means to Assess Sites and Move Toward Closure, Using Appropriate Site Specific Risk Evaluations?	John Wilson
Underground Storage Tank Site Closure Using Active Intervention for Site Cleanup	Al Venosa
What Research is Needed to Anticipate and Avoid Future Problems in Leaking Underground Storage Tanks?	Jim Weaver